REMARKS

This amendment includes the claims of the supplemental amendment dated December 21, 2006 filed in response to the personal interview with the Examiner held on November 13, 2006. The amendment is also drafted in response to the Office Action dated January 17, 2007, which did not include an action on the merits of the new claims 25 to 35 that were filed in the supplemental amendment. However since the supplemental amendment was e-filed on December 21, 2006 claims 25 to 35 are previously presented claims and have been so indicated herein above.

I. THE PROCEEDINGS OF THE EXAMINER'S INTERVIEW

During the Examiner's Interview the Examiner suggested that the current claims should be canceled and new claims should be filed in which there is a lower limit for the amount of bioactive glass in the preserved composition or added in the case of the method claim, the composition claims are limited to preserved cosmetic compositions, and the antibiotic of Greenspan and the silver ion of Shimono, et al, are excluded by defining the compositions of the bioactive glass with the more limited "consisting of" wording.

II. THE SUBJECT MATTER OF THE CLAIMS

Claims 25 to 35 have been drafted by adopting one of the Examiner's suggestions. In other words, there is a lower limit for the amounts of bioactive glass particulate in all method and composition claims. The lower limit has basis in the originally filed claims and the last paragraph on page 4 of the applicants' specification. Furthermore the bioactive glass particulate added to the preparation is limited to a preferred composition disclosed in the second paragraph on page 4 of the applicants' specification, which was original claimed in canceled claim 5.

New claims 36 to 46, on the other hand, are broader claims. The independent claims 36 and 41 are not limited to a special or preferred bioactive glass composition, except they are limited to a bioactive glass composition that includes both calcium and phosphorus in relative amounts that are sufficient so that when the bioactive glass particulate comes into contact with a water containing medium or moisture a hydroxyapatite layer is formed on the surfaces of the bioactive glass particulate as explained on page 3, especially page 3, lines 1 to 3, of applicants' originally filed specification. Basis for including the element Ca and P is found on page 3, lines 10 and 11, of applicants' specification. On the other hand, new claims 36 to 46 include the suggested lower limit for the amount of bioactive glass in the preserved composition.

In fact the applicants' specification teaches two preferred bioactive glass

compositions. A first preferred composition is disclosed in the last paragraph on page 3 of the applicants' originally filed specification and is made by the standard melt fusion methods. Claims that are limited to this first preferred glass composition are method claim 37 and composition claim 43. A second preferred bioactive glass composition for glass that is made by a sol-gel process is disclosed in the second paragraph on page 4 of applicants' specification and is now claimed in new method claim 38 and new composition claim 44.

III. Claims 25 to 46 are not Anticipated by Shimono, et al

Claims 25 to 46 are **not** anticipated under 35 U.S.C. 102 (b) by U.S. Patent 5,290,544 (Shimono, et al) because Shimono, et al, do **not** disclose a glass matrix for their toxic silver, copper, and zinc active ions, which contains both calcium and phosphorus in relative amounts that are sufficient for formation of hydroxyapatite, as claimed in independent claims 25, 36, 29, and 41.

IV. Possible Obviousness Rejection of Claims 15 to 46 based on Greenspan with or without Shimono, et al

The claims of the amendment dated October 3, 2006, which claimed methods and compositions limited to a bioactive glass particulate containing both CaO and P_2O_5, in a molar ratio of Ca to P of greater than 2, were rejected under 35 U.S.C. 103 (a) over International Patent Application WO 98/11853 of Greenspan in view of U.S. Patent 5,290,544 (Shimono, et al).

Particularly the method of using bioactive glass of Greenspan and the claimed method of using bioactive glass of the present invention are significantly different and not obvious from each other.

Greenspan discloses a method of using bioactive glass and an antibiotic for healing a wound e.g. caused by trauma in the human body. The method of Greenspan is based on the finding that the bioactive glass activates various cell factors, such as growth factors, implicated in tissue repair. In other words, Greenspan teaches the person skilled in the relevant art, i. e. someone having pharmacological and microbiological knowledge, that the bioactive glass induces a complicated biochemical mechanism in tissue that is responsible for wound repair. For example page 12, lines 11 to 16, of Greenspan are as follows:

> "While not being bound to any particular theory or mechanism, it is believed that the high surface area and reactivity of particulate bioactive glass provides for a release of sodium which increases pH and increase oxygen in the wound or burn which otherwise has a lower pH. This has a bacteriostatic effect and permits the antibiotic to function by activating various growth factors implicated in tissue repair. These reactions cause a higher negative surface charge on the glass surface and the development of a high specific surface area...*which attracts collagen, fibronectin and cell*. Moreover, the bioactive glass provides for precipitation of calcium and phosphorous *naturally present in the wound exudates and blood* which causes the rapid formation of a calcium and phosphate layer *that may incorporate collagen, fibrin and fibronectin* to stabilize the wound quickly and effectively." (Emphasis by underlining is ours)

Thus a person who is skilled in the medicinal or pharmaceutical art would conclude that the bioactive glass particulate that is not toxic!!! to the human body (because it can be applied to a wound) should obviously **not** provide any toxic or growth inhibiting activity by itself on other cells like microbes or bacteria without the help of the above-described network of interacting human cells and perhaps

the antibiotic that is a required ingredient in the applied composition of Greenspan.

Thus one skilled in the art after reading Greenspan would expect that if the bioactive glass particulate that is used by Greenspan would be added to an aqueous cosmetic composition the hydroxyapatite layer *might not* form on the bioactive glass particles because of the absence of blood and body fluids containing Ca and P and thus bacteria and other microbes present in the aqueous cosmetic composition would not be inhibited in their growth by the bioactive glass particles, also because the above-described network of interacting human cells was not present in the cosmetic composition.

Accordingly, the teaching of Greenspan, taken as a whole, would **teach away** from the present invention. Greenspan, as a whole, would suggest to one skilled in the art that his bioactive glass particulate would not have anti-cellular (microbial and tissue) action because otherwise one could not apply it to the wound for fear of killing or injuring living human tissue.

It is well established that a prior art reference that would lead one of ordinary skill in the art away from a claimed invention cannot be used alone or in combination with other references to reject a claimed invention under 35 U.S.C. 103 (a). See M.P.E.P. 2145 X. Also the Federal Circuit Court of Appeals has said:

> "In determining whether such a suggestion [of obviousness] can fairly be gleaned from the prior art...It is indeed pertinent that these references teach against the present invention. Evidence that supports, rather than negates, patentability must be fairly considered." ***In re Dow Chemical Co.,*** 837 F.2nd 469,473, 5 U.S.P.Q.2d 1529, 1532 (Fed.Cir. 1988)

In contrast to Greenspan, which describes the solution of an entirely different problem from that of the present invention, Shimono, et al, describe an alternative different solution to the same problem that the present invention solves, namely to the problem of bacterial contamination of cosmetic products. However Shimono, et al, use a method that is different from the present invention that requires a completely different glass matrix or different glass composition. The applicants' bioactive glass composition (and also that of Greenspan) is not obvious from that of Shimono, et al.

Furthermore one skilled in the cosmetic arts would not find any motivation or suggestion to combine the teachings of Greenspan with the teachings of Shimono, et al, to obtain the inventions claimed in the new claims 25 to 46 -- at least without the guidance provided in the applicants' specification, which is not permitted under U.S. Patent Law since it would be an impermissible use of hindsight and the discloses in the applicants' specification.

There is no motivation or reasonable suggestion in the prior art to replace the borosilicate glass or phosphate glass compositions of Shimono, et al, (column 1, lines 54 to 56) with the bioactive glass composition of Greenspan (claim 2) -- at least without an impermissible use of hindsight and the applicants' specification as a guide to select features from the references.

The method of Shimono, et al, comprises including a composition that releases toxic silver, copper and zinc ions in the cosmetic preparation. It has been known for centuries that these ions have antibacterial or antimicrobial

action. Methods of preservation have been based on this knowledge since biblical times. Shimono now teaches to provide these components in glass matrix that retards release of these active toxic ions in the cosmetic preparation. The retarding matrix glass slowly dissolves in water and thereby releases the antibacterial agent, i.e. silver, copper and zinc. The glass compositions of Shimono, et al, are soluble in water according to column 2, line 15 et seq and column 1, line 45 et seq. especially line 55 et seq.

However the glass matrix included in the cosmetic preparations by Shimono, is **not** a bioactive glass according to claims 25 to 46 because it does **not** include both calcium and phosphorus in relative amounts that are known to be sufficient for formation of a hydroxyapatite layer on the bioactive glass particles according to claims 25 to 46. The formation of this hydroxyapatite layer is the critical step in providing the glass particulate with antimicrobial activity. Thus one skilled in the art would expect that the glass matrix of Shimono, et al, would **not** have any bactericidal activity without the presence of the toxic metal cations of Ag, Cu and Zn in their glass matrix.

Shimono, et al, provide no general statement of their glass compositions, but only state that their glass may be a borosilicate glass or a phosphate glass. None of the exemplary compositions of Shimono, et al, have a composition that is similar to or the same as the bioactive glass of claim 2 of Greenspan and indeed e.g. the above claim 25. The following table I conveniently shows the relationship between all the examples of Shimono, et al, and Greenspan.

In Table I X indicates that the ingredient on the right side is a required ingredient of the glass composition that is associated with the column in which the X is located. The (X) indicates a required ingredient.

TABLE I. GLASS COMPOSITIONS OF SHIMONO AND GREENSPAN

Ingredient	Shimono Ex. 1	Shimono Ex. 2	Shimono Ex. 3	Shimono Ex. 4	Greenspan Claim 2	Greenspan P. 10-11
SiO_2	X				X	X
B_2O_3	X				(X)	
Na_2O	X				X	X
P_2O_5		X	X	X	X	X
CaO		X		X	X	
Al_2O_3		X	X			
MgO			X		(X)	
K_2O				X	(X)	
Ag_2O	X	X	X			
CuO				X		
CaF_2					(X)	

The Office Action on page 6, lines 2 and 3, states that Shimono, et al, disclose a bioactive glass composition that may comprise SiO_2, CaO, Na_2O, P_2O_5, K_2O, and/or MgO. This statement on page 6 of the Office Action is incorrect because **no glass composition** of Shimono, et al, **includes** SiO_2, CaO, and P_2O_5 (thus "and" in "and/or" is incorrect). Also no glass composition in Shimono, et al, has the same required ingredients as the glass composition of claim 2 of Greenspan, which **must** include SiO_2, CaO, Na_2O, and P_2O_5. As the above table shows example 1 is a borosilicate glass containing SiO_2, B_2O_3, Na_2O

and Ag_2O so that a hydroxyapatite layer could not possibly form on the glass particulate due to the absence of Ca and P. Examples 2 and 4 of Shimono, et al, do include both CaO and P_2O_5 but CaO is present in an amount that is small in comparison to P_2O_5 so that the hydroxyapatite layer cannot form to a significant extent and provide the bactericidal action. Example 3 of Shimono, et al, does not include CaO.

The motivation or suggestion to combine Greenspan with Shimono, et al, to obtain the claimed invention under 35 U.S.C. 103 (a), as stated in the last sentence on page 6 of the Office Action, is the following:

> "One of ordinary skill in the art at the time the instant application was filed would have had a reasonable expectation of success at preserving said cosmetic preparation by imparting bactericidal properties to said cosmetic preparation, via the addition of the particulate bacteriostatic bioactive glass composition of the Greenspan publication, since the particular bacteriostatic glass composition the Shimono '544 patent may, similar to the particular bacteriostatic bioactive glass composition of the Greenspan publication, likewise comprise: SiO_2; CaO; P_2O_5; K_2O; and/or MgO."

This statement of motivation to combine is incorrect for several reasons. First as explained above Greenspan does not disclose or suggest that the glass composition of claim 2 has bactericidal action in and of itself. Greenspan only teaches that the glass composition of their claim 2 will speed the healing of a wound when applied to the wound together with an antibiotic compound. Second the statement that the glass compositions of Shimono '544 comprise: SiO_2; CaO; P_2O_5; K_2O; **and** MgO is simply incorrect. They only include **some** of these listed ingredients. The statement that the glass compositions of Shimono '544

comprise: SiO_2; CaO; P_2O_5; K_2O; **or** MgO makes no sense at all as a motivational statement for the combination.

In fact Table I above shows that the compositions of Greenspan are unrelated to any of the compositions of Shimono, et al, and *vice versa*.

There is no reasonable suggestion in the prior art or in these two cited references to replace any of the exemplary compositions of examples 1 to 4 of Shimono, et al, with the composition of claim 2 of Greenspan, because the resulting bioactive glass composition that is included in the cosmetic preparation would not include the silver ion or copper ion containing compounds that according to Shimono, et al, are required to provide the bactericidal action. Shimono, et al, teaches against such a replacement. Furthermore as noted above one skilled in the pharmaceutical or medical arts would not expect that the glass of claim 2 of Greenspan would have bactericidal or antimicrobial action by itself from the disclosures in Greenspan alone and would expect the opposite because it is applied to living cells in a wound of a human being.

Thus the cited art itself teaches against the replacement of the glass composition of Shimono, et al, with the glass composition of claim 2 of Greenspan.

With respect to amended method claim 25 the claimed method comprises adding a bioactive glass **consisting of** the composition of claim 2 of Greenspan. The same is also true of the composition claim 29: the bioactive glass consists of the glass of claim 2 of Greenspan and thus silver and copper as excluded from the glass preservative. Also claim 29 excludes and claim 25 has been amended

to exclude an organic preservative compound, such as an antibiotic of Greenspan. Thus there is no reasonable motivation or suggestion in the art to combine Greenspan with Shimono, et al, to obtain the inventions claimed in claims 25 and 29.

The same logic applies to claims 36 and 41. At best one might suppose that the glass matrix portion of the glass composition of Shimono, et al, might reasonably be replaced by the glass composition of claim 2 of Greenspan, but the result would be a glass particulate that includes either silver or copper ions. There is no motivation to dispose or eliminate the silver or copper ions because these are the only active ingredients with antibacterial action disclosed in the two prior art references.

Furthermore one skilled in the art would not combine Greenspan with Shimono, et al, for any purpose and especially in order to arrive at the present invention.

It is respectfully submitted that new claims 25 to 46 should **not** be rejected as obvious under 35 U.S.C. 103 (a) over International Patent Application WO 98/11853 of Greenspan in view of U.S. Patent 5,290,544 (Shimono, et al).

V. Obviousness Rejection based on Greenspan and Shimono and Various Scientific Journal Articles

Canceled claims 16 to 18 and 20 were rejected under 35 U.S.C. 103 (a) over U.S. Patent 5,290,544 issued to Greenspan in view of Shimono, et al, and in further view of Yamanaka, et al, Chem. Materials **4**(3), pp. 495-497 (1992); Wu,

et al, Chem. Materials **5**(1), pp. 115 - 120 (1993); and Wang, et al., Anal. Chem. **65** (19), pp. 2671- 2675 (1993).

Claims 16 to 18 and 20 were canceled, obviating their rejection on this ground.

No independent claims including the refractive index limitation in the last paragraph of claim 16 are currently pending. The index of refraction limitation is only present in dependent claim 35.

Claim 35 should be allowed because it depends on a presumably allowable claim 29. No arguments that rely on the index of refraction limitation will be presented here.

The above technical articles only disclose information that is relevant to the subject matter of claim 35, which is the near invisibility of a glass particulate suspended in a liquid depending on the refractive indices. Thus the disclosures in the above articles would not suggest the modifications of the subject matter of Greenspan and Shimono, et al, that are necessary to arrive at the invention as now claimed in independent claims 25, 29, 36, and 41.

For the foregoing reasons it is respectfully submitted that claims 25 to 46 should **not** be rejected under 35 U.S.C. 103 (a) over Greenspan in view of Shimono, et al, and further in view of Yamanaka, et al, Chem. Materials **4**(3), pp. 495-497 (1992); Wu, et al, Chem. Materials **5**(1), pp. 115 - 120 (1993); and Wang, et al., Anal. Chem. **65** (19), pp. 2671- 2675 (1993).

Should the Examiner require or consider it advisable that the specification,

claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

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